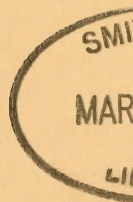


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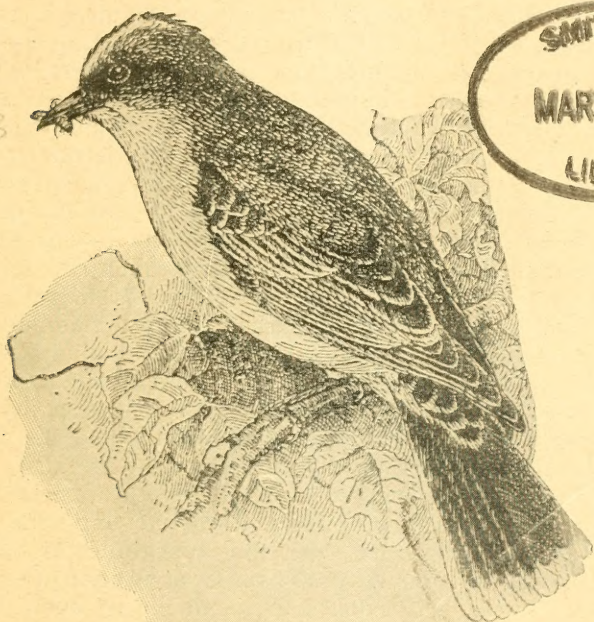
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THE KINGBIRD.
(After *Biological Survey.*)

Guide for North Dakota Bird Study

By W. B. BELL

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FOR THE PEOPLE OF THE STATE OF NORTH DAKOTA
NEXT NUMBER --- FARM ANIMALS

Guide for North Dakota Bird Study

Growth of Bird Study

The rapidly growing interest in the study of birds has made necessary the preparation of a guide which may serve to direct the many bird observers in North Dakota along the lines which should yield the greatest pleasure and profit to themselves and the largest advantage to the state.

It is earnestly hoped also that the pointing out of the way to make a beginning may stimulate others, who have hesitated because of apparent difficulties or obstacles in the way, to enter this fascinating field where so many important discoveries await the alert and sympathetic student. The past decade has witnessed a most remarkable spread of interest throughout the United States in bird life from the relatively few enthusiastic ornithologists to the hundreds of thousands of people who are now coming to know and appreciate birds as never before. This movement is only in its beginnings, however, and the coming decade should see a much wider diffusion of the spirit of first-hand bird study. Many factors have contributed to give dynamic impetus and to render this movement possible. Organizations have been effected which united, stimulated and directed the members in all parts of the country. An abundant literature accompanied by simple methods of learning the names of birds has been developed. Colored pictures showing with remarkable accuracy the color, form and appearance of the living birds often in their natural haunts have been prepared by the greatest of naturalist artists and placed upon the market at prices which put them within the reach of all and through the proper use of these the birds themselves come to be recognized and known.

The development of methods of bird photography has not only afforded interesting activity for many people but has provided a wealth of illustrative material for popular accounts of birds and their habits in books, periodicals and lectures.

The extensive investigations of the United States bureau of Biological Survey have not only furnished important information relative to the distribution, abundance and migration of birds but have provided a substantial basis of economic facts in their publications for a proper appreciation of the important relation of birds to human industries.

Many state biological surveys have likewise added their quota to the accumulating data along similar lines of local study. The introduction of bird study in its varied phases into the public schools has been a most important means of reaching not only the rising generation of children but through them extending the message and spirit to the older generation.

Many clubs and organizations not primarily devoted to bird study have also rendered valuable assistance in the progress of this movement through the presentation of special papers and lectures upon topics related to bird life and habits as numbers upon their regular programs.

The recognition within recent years of the fact that much of our best education and the most fundamental lessons of life come not from the reading of books alone but by learning first-hand from nature has given a new trend and a more helpful attitude toward life out of doors. The significance of alert attentiveness to the varied forces at work among living things is being realized and made a prominent factor in human development.

Bird Study for All—The availability and suitability of bird study for all ages and conditions of mankind has made this an especially attractive field. The little child less than two years old will shout and clap its hands with glee as it toddles along toward a bird on the lawn. In response to the same deep seated instinct of their nature the growing boys and girls full of superabundant energy may find suitable and helpful occupation in the pursuit of these elusive creatures in their varied haunts. Proper direction of his activities is usually all that is necessary to transform the normal boy into one of the most useful bird protectionists. As mature age is reached a still enlarging field of interest opens up. The study of individual birds and species, their abundance, distribution, migrations, nesting and feeding habits and their intricate relation to human life and affairs affords avenues from which each may select according to taste and inclination. Rich or poor, healthy or infirm, the invalid reclining at a window, the hardy persons who tramp afield and those who employ the space-defying automobile, all may find in the birds lines of interest suited to their needs and opportunities full of possibilities of enlarging the horizon of their lives. Such worthy examples as the venerable John Burroughs show that with advancing years these life-long interests may be pursued with undiminished ardor and enthusiasm adding zest and richness to what should be, but too often is not, the crowning period of life.

Why Study Birds—The study of bird life is not advocated because of sentimental considerations for the birds themselves, but on account of their important relation to human life and welfare. An analysis of the subject from this point of view reveals the fact that birds are to be considered from the standpoint of three main groups of people, though the same person may have a place in each of these groups. 1st, those who are interested in birds because of the pleasure to be derived from acquaintance with the living bird, 2nd, those who are interested as hunters in the game birds, and 3rd, those who are financially interested in birds because of their economic relation to such lines of production as agriculture, horticulture and forestry.

Persons who belong to the first group and find their greatest pleasure in the living birds have a much stronger claim for the recognition of their rights than has usually been appreciated. People as a whole are just beginning to realize that the gaining of wholesome pleasure is not merely a harmless pastime but that this is of fundamental importance in the development of a worthy, well-rounded human life. The brightest minds of the present day are being devoted to a solution of the problem of how to bring a larger proportion of pleasure into the lives of larger numbers of people. It is coming to be recognized that much of the intellectual, social, and economic stagnation in the world is due to the fact that not enough pleasure is sought or found to satisfy and stimulate the life to its largest possibilities of accomplishment and development. Witness the movements on foot to provide playgrounds for the children, to arrange for shorter hours of labor and longer hours and suitable places of recreation for those who toil and especially the efforts that are being made to organize those who live more or less isolated lives in the country into social communities where young and adults may seek and find pleasurable activities sufficient to satisfy the natural craving of the mind for pleasure. Hence, when we, as a people, come to appreciate more fully the fascinating delight, the wholesome influence and the recreational value of tramping the fields, roaming the woodlands, wading the sloughs or boating on the waters to get acquainted with the living birds, the more confidently may this right to enjoy one of nature's choicest heritages be asserted and maintained. Birds being a natural wild and shifting population, belong to all the people, hence are rightfully declared in the law to be the property of the state as a whole. On this ground the people of the state are justified in insisting that even though a given bird has no

special economic value, nevertheless if not harmful it should be preserved to give charm to the landscape and afford pleasure to the people who find increased enjoyment because of the presence of those creatures which are the living embodiment of beauty, grace, music and domestic felicity. The people of North Dakota have in the past thought too little about the discovery and perpetuation of those features of her natural endowment which add delight to existence. Now that people are coming from far distant places to study our bird life and find it well worth their time and effort, when local bird students who have studied our North Dakota birds for many years attest the richness of the possibilities which lie within the state, when we are dealing with living forms which respond so quickly to favorable conditions, is it not time that we as a progressive, farsighted people awake to the opportunity and responsibility of maintaining and adding to the natural attractiveness of the state by adequate protection of this one of our greatest natural heritages? This must be brought about largely through an awakened public sentiment and the individual activities of the people by directing and controlling conditions upon their own property and in their own community. Hence the importance of having interest in birds diffused through all available channels until it reaches all the people in every community in the commonwealth.

Next the point of view and the rights of the second group—the hunters,—not only of the present time but of generations yet unborn, must be considered. To insist that all hunting and killing of game birds is wrong is to maintain that one of the most deeply planted instincts of the masculine human nature is a perversion. The primitive races of men found their means of livelihood largely through hunting and success in life was conditioned upon strength, endurance and skill in the hunt. A large majority of perfectly normal boys still, and perhaps ever will, pass through a period of their individual development when the hunting instinct is dominant and must be properly directed or gratified if the boy is to develop those hardy, alert and vigorous qualities which are of prime importance in the making of a man. Annually thousands of mature men, weary and worn by the strenuous and often unnatural toil of modern civilized occupations, find in the pursuit of game birds the allurements which leads them to forsake business for a few days and betake themselves to the health-giving influence of woods and fields. Here in the haunts of the game birds in contact with the ele-

mental forces of nature, engaged in a pursuit which requires vigorous physical activity and absolute forgetfulness of other affairs for success in the sport they find relaxation, rest and recuperation. Much of the disrepute associated with hunting and hunters has arisen through the disregard by some thoughtless or inconsiderate men of the property rights of those on whose land they are hunting and through a failure to restrain their immediate self-interest for the larger good of the community. Men must learn to be content with a reasonable bag of game, at least with that number which corresponds with the consensus of public opinion as indicated by the legal limit. Men may learn that the pleasure and benefit to be derived from the hunt are not conditioned upon unlimited slaughter, but rather upon the associations and enjoyment of natural surroundings which the hunting season affords. Many boys and men have learned that even greater pleasure and benefits may be derived from the study and photographing of the living birds, because of the much higher degree of hunting and stalking skill required, because of the larger opportunity which this affords for real acquaintance with the bird and its habits and the even more attractive and valuable trophies which they have to show. People of North Dakota should realize that a public-spirited, far-sighted policy requires that the splendid natural resources be maintained not only for the enjoyment of the present generation but passed on unimpaired to succeeding generations so far as this is possible in civilized communities and consistent with agricultural interests. Here again, there is the greatest need for the development of an enlightened public sentiment so that as individuals and communities we shall neither exercise nor tolerate that spirit of unlimited destruction of game which has led to the practical extermination of game in many places and is so seriously reducing the numbers of many of our own game birds, but rather devise ways and means to increase and perpetuate them.

Last, and in many respects, the most important of all is the standpoint of those who are interested in birds from financial considerations. Too long people have been accustomed to look upon birds as objects only of sentimental interest. How often one hears the remark dropped by persons unfamiliar with modern methods of bird study that there is nothing of practical value about the study of birds. No more mistaken view could well be imagined. A modern view based upon the most carefully investigated facts is that recently expressed by Dr. H. W. Henshaw, Chief of the U. S.

Bureau of Biological Survey, that without the services of insect-eating birds, "it is more than likely—nay, it is almost certain—that within a limited time not only would successful agriculture become impossible, but the destruction of the greater part of vegetation would follow." The following statement made by F. E. L. Beal in 1897 is significant in this connection. "It has been known that birds play an important part in relation to agriculture, but there seems to be a tendency to dwell on the harm they do rather than on the good. Whether a bird is injurious or beneficial depends almost entirely upon what it eats, and in case of species which are unusually abundant or which depend in part upon the farmers' crops for subsistence the character of the food often becomes a very practical question. If crows or blackbirds are seen in numbers about corn fields, or if woodpeckers are noticed at work in an orchard, it is perhaps not surprising that they are accused of doing harm. Careful investigation, however, often shows that they are actually destroying noxious insects, and also that even those which do harm at one season may compensate for it by eating noxious species at another. Insects are eaten at all times by the majority of land birds, and during the breeding season most kinds subsist largely and rear their young exclusively on this food. When insects are unusually plentiful, they are eaten by many birds which ordinarily do not touch them. Even birds of prey resort to this diet, and when insects are more easily obtained than other fare, the smaller hawks and owls live on them almost entirely. This was well illustrated during the recent plague of Rocky Mountain locusts in the Western States, when it was found that locusts were eaten by nearly every bird in the region, and that they formed almost the entire food of a large majority of species."

Since this was written extensive investigations have been carried on in all parts of the United States and at all seasons of the year. Detailed information is now at hand, regarding the food habits of most of our common species. That of other species is being worked out as rapidly as state and national funds will permit. In case a question arises regarding the apparent destructiveness of any species before beginning indiscriminate slaughter the matter should be referred to those expert in these matters either in the Department of Agriculture at Washington, D. C., or the N. D. Agricultural College and Experiment Station. Available information will then be furnished as a basis for judgment regarding further procedure and in case there is need for fur-

ther investigation of the situation the scientific machinery of state and nation is at the service of the citizens.

Economic Relations of Birds

With reference to the general economic status of birds it is customary to classify them in four main groups as outlined by A. K. Fisher:

- (a) Those wholly beneficial or wholly harmless
- (b) Those chiefly beneficial
- (c) Those in which the beneficial and harmless qualities seem to balance each other.
- (d) Those positively harmful.

To determine in which of these groups a given bird belongs involves a vast amount of patient labor including field observation, experimental feeding and study of the actual stomach contents of many birds taken in different places and at all seasons of the year. The matter is one of too grave importance to depend upon hasty judgments or casual observation.

The principal services which birds render are usually grouped into:

- (a) The destruction of harmful insects, both those which prey upon crops and trees and those which spread disease.
- (b) The destruction of injurious mammals especially rodents, such as rabbits, gophers, ground-squirrels and mice.
- (c) The destruction of weed seeds.
- (d) Serving as scavengers by removing offensive and dangerous decaying materials.

Birds are nature's most efficient check in preserving a proper balance in nature, that is, in preventing the undue increase of insects, rodents and weeds. Where natural conditions are left undisturbed by man this balance is maintained with remarkable perfection. But, civilized man is everywhere a disturbing element in this perfect natural harmony. His activities and occupations usually tend to cause a reduction in the number of birds at the same time that his agricultural operations make conditions more favorable by providing shelter and additional food for the increase of insect, mammal and weed pests. One frequently hears the remark that there is no need to worry about those thing up here in North Dakota, that conditions are such that we shall never be bothered by them, especially insects. They used to talk that same way in what are now the older settled states and this complacent or ignorant attitude led to neglect of proper control over nature's forces until now in spite

of spending much time, labor and millions of dollars annually in combatting these pests by artificial means, the people are constantly suffering defeat and enormous losses. No thoughtful, careful observer can fail to see that these conditions are developing in North Dakota. Only ordinary intelligence and foresight are required to see that eternal vigilance and the employment of all the natural means to keep these pests from multiplying is our only hope of escaping continually increasing losses. Already large sums are being spent in spraying operations against insects and single counties are spending amounts running to thousands of dollars annually distributing poison to decrease the number of gophers. The annual loss to the grain producers through the depletion of the soil, lessened yield in spite of increased labor and lowered grade of grain because of the presence therein of weed seeds is perhaps even better appreciated by most farmers.

The following data taken largely from the reports of the Bureau of Biological Survey of the U. S. Department of Agriculture, can be confidently accepted as applying well to North Dakota conditions. Large numbers of bird stomachs have been examined and field studies made in connection with the Economic Biological Survey of North Dakota which give abundant warrant for the above statement. The detailed results for North Dakota will be compiled and reported in due time. (See account of Biological Survey beyond.)

Birds and Insects. In order to appreciate the work of birds in holding in check the increase of insects one should remember that this work is continued by different species all the year through both by day and night, that birds eat a much larger amount of food in proportion to their size than most animals, that not only the adult breeding insects are destroyed, but their eggs and young are eaten in enormous quantities and thus their development and reproduction are prevented. One should recall also that if unchecked the offspring of a single adult female insect living from spring to fall will run from hundreds up to hundreds of millions depending upon the species. Think what it means to have only a single one of these insects killed in spring as you consider the following facts. The damage now done by insects in the United States amounts to several hundred millions annually the entire loss for 1909 being estimated by Dr. L. A. Howard, Chief of the U. S. Bureau of Entomology as \$1,200,000,000.. This means several dollars for every person in the entire population of

the United States. Another investigator estimates that 21,000 bushels of insects are eaten daily in Massachusetts by the birds. Another that 170 carloads of insects are destroyed in Nebraska each day. A pair of nesting Wrens has been observed to take over 600 insects from a garden in one day, while investigation shows that 98 per cent of the food of Wrens consists of insects. A young Robin in one day ate 165 cutworms while another young Robin ate from 50 to 75 cutworms per day for a 15 day period. A study of 330 stomachs of Robins shows that 42 per cent of the food was animal matter largely insects and their larvae and 47 per cent wild, not tame, fruit. One Chickadee had 454 plant lice in its stomach. A Cedar Waxwing's stomach contained 100 cankerworms, that of a Nighthawk 60 grasshoppers, that of a Flicker 1000 chinch bugs. A Maryland Yellowthroat was reckoned as having eaten 3,500 plant lice in 40 minutes. Insects and their allies constituted 76 per cent of the contents of 205 Bluebird stomachs. Caterpillars made up 34 per cent of the stomach contents of 113 Baltimore Orioles. Stomachs of 238 Meadowlarks examined showed 73 per cent animal matter, nearly all insects. Grasshoppers and Crickets were the important items of the bill of fare being 29 per cent average for the entire year and 60 per cent for August. During August and September the food was 99 per cent insects. Space will not permit the giving of further data, but those who are interested are referred to the list of bulletins beyond in which a wealth of important information may be found.

Birds and Rodents. The amount of damage done each year by small rodents such as rabbits, hares, gophers, ground-squirrels and prairie-dogs is usually fairly well appreciated. The number of different species of mice which the biological survey work has shown to be present, hiding not only about houses, barns, granaries and meadows but along fence-rows, sloughs and strips of timber, with their enormous possibilities of increase and mischief to crops, stored grain and trees is not so well understood. Neither is the important work of hawks and owls in holding these pests in check at all adequately realized. Deep-seated prejudice against these birds still holds sway. Farmers and hunters shoot them down at sight with little thought of the loss which this thoughtless destruction may entail. The possibilities of loss through this condition of affairs was set forth with remarkable clearness in 1886 by Dr. C. Hart Merriam, for many years Chief of the U. S. Biological

Survey in discussing the law passed, but soon repealed by Pennsylvania providing a bounty on hawks and owls. "On the 23d of June, 1885 the Legislature of Pennsylvania past an act known as the "scalp act," ostensibly for the benefit of agriculture, which provides a bounty of fifty cents each on Hawks, Owls, weasels and minks killed within the limits of the state and a fee of twenty cents to the notary or justice taking affidavit.

By virtue of this act about \$90,000 has been paid in bounties during the year and a half that has elapsed since the law went into effect. This represents the destruction of at least 128,571 of the above mentioned animals, most of which were Hawks and Owls.

Granting that 5,000 chickens are killed annually in Pennsylvania by Hawks, and Owls, and that they are worth twenty-five cents each (a liberal estimate in view of the fact that a large portion of them are killed when very young) the total loss would be \$1,250 and the poultry killed in a year and a half would be worth \$1,875. Hence it appears that during the past eighteen months the State of Pennsylvania has expended \$90,000 to save its farmers a loss of \$1,875. But this estimate by no means represents the actual loss to the farmer and the tax payer of the state. It is within bounds to say that in the course of a year every Hawk and Owl destroys at least a thousand mice or their equivalent in insects, and that each mouse or its equivalent so destroyed would cause the loss of two cents per annum. Therefore, omitting all reference to the enormous increase in the numbers of these noxious animals when nature's means of holding them in check has been removed, the lowest possible estimate of the value to the farmer of each Hawk, Owl and weasel would be \$20 a year, or \$30 in a year and a half.

Hence, in addition to the \$90,000 actually expended by the state in destroying 128,571 of its benefactors, it has incurred a loss to its agricultural interests of at least \$3,857,130, or a total loss of \$3,947,130 in a year and a half, which is at the rate of \$2,631,420 per annum. In other words the state has thrown away \$2,105 for every dollar saved. And even this does not represent fairly the full loss, for the slaughter of such a vast number of predaceous birds and mammals is almost certain to be followed by a correspondingly enormous increase in the number of mice and insects formerly held in check by them, and it will take many years to restore the balance thus blindly de-

stroyed through ignorance of the economic relations of our common birds and mammals." The above view was well substantiated by subsequent developments and investigation. Fortunately no such folly has occurred in North Dakota as the passage of a law paying a bounty on Hawks and Owls, nevertheless, this indiscriminating slaughter still goes on because of prejudice and just for the fun of shooting something. If it be true, (and it is well within the true value) that each Hawk and Owl on the average is worth \$20 per year to the farmer it is high time that people stopped to think and discriminate before shooting. No sane man would deliberately shoot a farmer's pig or calf worth \$20 just for fun. Then why shoot these birds which are equally valuable to the farmer and the state?

There are three Hawks, Cooper, Sharp-shinned and Goshawk, and one Owl, Great-horned Owl, that are positively harmful and may very properly be shot. But the rest of the Hawks and Owls commonly resident in North Dakota belong to the class which are either entirely beneficial or the beneficial qualities outweigh the harmful. The harmful features of these latter may readily be overcome by reasonable protection of the poultry, encouraging Kingbirds and Purple Martins to nest about the poultry yard or premises and occasionally shooting a particular Hawk or Owl which is positively known to have acquired the habit of killing poultry. The latter method will seldom need to be employed. For further information consult the literature cited beyond, especially "Hawks and Owls from the Standpoint of the Farmer," by A. K. Fisher or "Useful Birds and their Protection," by E. H. Forbush.

Birds and Weed Seeds. Birds are occasionally accused of scattering weed seed by carrying them in mud on their feet or dropping them with the excrement. This is so small an item compared with the enormous number of weed seeds destroyed as to be negligible. Anyone who will take the trouble to go out through the weed patches during September, October and November while the Juncos, White-throated, Harris and Tree Sparrows and others are migrating can see abundant evidence of the hosts of helpers in the constant struggle of the farmer to keep down the weeds. Continuing this observation through the winter, spring and summer will be a revelation to any alert, thoughtful observer. According to the careful investigations and estimate of F. E. L. Beal of the U. S. Biological Survey, the Tree Sparrows alone destroy 875 tons of weed seed annually in the

single state of Iowa. A single stomach contained 700 seeds of pigeon-grass. Couple with this the weed seeds destroyed by the many other equally valuable native species of Sparrow found abundantly in Iowa and North Dakota and we have a grand total which means an incalculable saving to the people of the state.

The examination of 725 stomachs of the Red-winged Blackbird showed 74 per cent was vegetable matter mostly weed seeds, while the remainder consisted largely of weevils and grasshoppers. The stomachs of Mourning Doves contained 64 per cent of weed seed for the entire year including such pests as pigeon-grass, rag-weed and smart weed. One stomach alone contained 6,400 seeds of fox-tail grass. The stomach of a Snow Bunting contained 1000 pig-weed seeds. A long list of valuable birds might be enumerated here, but those who are interested are urged to make their own observations in the field throughout the year and study the literature listed beyond.

Organizations in North Dakota devoted to Bird Conservation.

(a) North Dakota Audubon Society with headquarters at Fargo and branch societies and executive secretaries located at many points throughout the state. Affiliated with the National Association of Audubon Societies.

(b) North Dakota Game and Fish Protective Association with headquarters at Fargo and membership distributed through the state.

National and State Game and Bird Reservations.

(a) Stump Lake, N. Dak., is a national reservation "in the midst of the breeding grounds of several species of ducks and is the only point at which the white-winged scoter is known to breed in the United States." Large numbers of other shore birds and water fowl also rest and nest here. Alf. Eastgate of Tolna is the warden in charge.

(b) Chase Lake, in Stutsman County is also a national reservation where "are important colonies of white pelicans and ring-billed gulls." Geese, ducks and many other water fowl nest here.

(c) In 1910 Devils Lake, including Bird Island, the Chautauqua grounds and the Fort Totten Military Reservation were made a state bird reservation. Mrs. Wm. Folger an enthusiastic bird student and Audubon Society worker who spends much time at the Chautauqua grounds

is authority for the statement that birds have increased here very markedly since the establishment of this preserve where birds are safe from harm and disturbance.

(d) Other state and national preserves are greatly needed scattered at suitable places though the state where our native birds and valuable game animals may live and multiply undisturbed. This movement is already under way and the matter is now under advisement by those in authority.

Legal protection of birds in North Dakota.

(a) Laws relative to bird protection are enforced by a Board of Control appointed by the Governor consisting at present of N. E. Byerby, Velva, T. D. Casey, Secretary Dickinson and J. P. Lyon, Michigan, N. D. and two chief game wardens appointed by them, namely, E. H. Stenwick, Minot and Fred McLean, Fargo and other wardens in turn appointed by them.

(b) No person is allowed to hunt unless provided with a license secured from the county auditor.

(c) All birds not enumerated in the law as game birds are protected at all times except that blackbirds, crows, English sparrows, Sharp-shinned Hawks and Great-horned Owls may be killed at any time.

(d) Game birds include "the anatidae commonly known as the swan, geese, brant, river and sea-ducks; the limicolae commonly known as plover, snipe, woodcock; the gallinae commonly known as grouse, prairie chicken, pheasants, partridges and quail." On these there are open and closed seasons and specified bag limits.

(e) "No person shall catch, take, ship or cause to be shipped to any person within or without the state, purchase, offer or expose for sale, sell to anyone, have in possession with intent to sell, or have in possession or under control at any time, living or dead, any wild birds other than a game bird, nor any part thereof, irrespective of whether said wild bird was captured or killed within or without the state."

(f) Copies of the Game Laws of North Dakota may be obtained from the Game and Fish Board of Control by addressing the secretary.

What can be done to aid the birds.

(1) Provide artificial nesting sites for the species that nest in hollow trees or in the cornices and cavities of buildings.

(2) Plant thickets of berry-bearing trees and shrubs along the roads or in waste places on the farm, or as ornamental clumps on lawns.

(3) Carefully protect the birds already occupying the premises.

(4) Supply water for birds and food at times when they have difficulty in obtaining a sufficient supply.

(5) Train and instruct the present and the rising generation of people regarding the usefulness and importance of birds.

Biological Survey of North Dakota.

During the past year a particularly important co-operative arrangement was effected for the study of the North Dakota birds and mammals. The biological surveys conducted by the University, the Agricultural College and Experiment Station, and the Bureau of Biological Survey of the U. S. Department of Agriculture, have been united in a co-operative plan to study and report upon the birds and mammals of the state with reference to life zones, their distribution and relation to agriculture. North Dakota is fortunate in being among the first of the states to secure the cooperation of the U. S. Bureau of Biological Survey with its incomparable methods and facilities for work in a thorough detailed study of the biological conditions of the state. Field work has been carried on actively during the past summer and is being continued together with the necessary laboratory investigations.

OUTLINE SUGGESTIONS OF BIRD STUDIES WHICH MAY BE UNDERTAKEN BY INDIVIDUALS, SCHOOLS OR CLUBS.

1. General procedure.

Morning and late afternoon and evening are the most favorable times of day to study birds. Learn by experience the best localities in your vicinity for finding birds, but do not confine yourself entirely to these places.

Move slowly and quietly and remain perfectly quiet, hidden in suitable places, at frequent intervals. Dress in plain colors which tend to blend with your surroundings. Learn to lure birds out into view by using the "squeak" made with the lips by producing a kissing sound on fingers or back of the hand.

Keep the sun at your back as much as possible in order to see colors clearly. Be alert to every movement and sound. Opera or field-glasses are exceedingly useful in making out details. Always carry a small pocket note book and pencil and jot down notes and sketches at once while facts are fresh in mind.

Learn the parts of a bird's body as this will greatly increase facility in accurate observation and recording. (See figure of bird topography.)

2. Study of Birds Afield:

(a) Size, form, general color and any special markings such as spots, stripes, bars, borders or bands on head, back, breast, wings and tail by which it may be recognized. Do colors blend with surroundings? Approximate length and shape of bill, neck, wings, body, tail, legs and toes. Learn to sketch birds showing form and indicating color pattern, if possible, color with colored pencils, crayons or water-colors.

(b) Manner of Flight:—How does it start? Is flight light or heavy? Are wings flapped constantly or at intervals? If at intervals, how are wings held in the meantime? Does it soar? Is flight in a straight line, an undulating line, a zig-zag or a circle? Does it alight lightly and well balanced or awkwardly? Does it alight in trees, on the ground, or in water? If it alights in water, does it come down with a splash, a dip or settle gently on the water? Can it catch insects on the wing? Can it catch insects or other prey in water without alighting or entering the water? Does it usually fly long or short distances? Do they fly singly or in flocks? Does this vary with the season? In what position are the legs and neck carried during the flight? These points are especially useful in learning to recognize birds at sight.

(c) Does it walk, run, hop or swim? Was it on a tree trunk, among the limbs or leaves, on the ground or in the air or water?

(d) Nesting habits.—In studying nesting habits be careful not to frighten the parent birds or injure the nest or eggs. Never handle the eggs. On what day were they first observed building a nest? Where is the nest placed eg: on tree, shrub, ground, grass, eaves or bridge? Of what is the nest made? Is it neatly, compactly and strongly built? What is the size and shape of the nest? How many eggs are laid? When do they begin laying eggs? What is the size, form and color of the egg? How many

are laid in a nest? What are the actions of the male and female bird during the time the eggs are being incubated? When do the eggs hatch? When do the young birds begin to leave the nest and fly? Do the parent birds care for them during this time? If so, in what ways? What do they feed to the young birds? How do the young birds take the food? Is the color of the young birds the same as that of the old ones? Locate nests and then wait until the young birds are hatched and gone to examine the nest in detail.

(e) *Habitat*.—Does the bird live on the uplands, on the water or along the border of streams, sloughs or lakes? Does it frequent grain fields, woods or meadows?

(f) *Residence*.—Does it stay in your neighborhood all the year? If not, at what time do you see the first of its kind in the spring? When do they become common? Do they remain only a few days or remain all summer? Do they gather in flocks in the fall before migrating southward? At what time do they leave for the south? Why do they leave? What birds stay all winter? What birds are seen only during winter? Where do they spend the rest of the year? During what part of the winter do they remain here?

(g) *Food Habits*.—What do the birds eat and how do they get it? What do they feed the young birds? Do they eat weed seeds, grain, insects or rodents such as mice and gophers? Do they eat standing grain, grain in shock or scattered waste grain? Be sure to distinguish whether they are really eating grain or picking off insects. Do they eat any insects or other things which are a pest to your crops, garden or trees? Do they get their food by scratching? Do they scratch with one foot at a time or both at once? Do they capture food while in flight? In what sort of places do they hunt for food?

(h) How can you increase the number of the useful birds about the home, garden, orchard, or farm? Try fixing a place where they can drink and bathe undisturbed, placing food where they can get it, especially when natural food is scarce on account of the season or storms, making simple bird houses out of boxes, hollow sticks, etc., placing them where prowling cats cannot disturb, and note the results. A few of their favorite wild fruit trees planted about the home will attract them and at the same time, protect the cultivated fruits. Work out other methods of encouraging birds about the home.

(i) **Song.**—Note and try to imitate the various songs, cries, call-notes, notes of alarm, scolding, etc. Do they sing while sitting or during flight or both? Does the same bird have different songs for different times of the day or seasons of the year? Does it sing in the early morning, in the heat of the day, or in the evening? Learn to recognize the birds by their notes and calls. Do they sing or chatter while feeding? Do they sing while nesting or while feeding the young? Do they continue to sing after young are hatched?

(j) **Learning the bird's name.**—To know the various kinds of birds in your locality by sight and notes and to determine the facts suggested in the above outline, are far more important than knowing their names. Do not allow the fact that you do not know the name of a bird to keep you from becoming personally acquainted with him. It is then easy to learn the names of most of the birds in your locality by talking with persons who know the birds by name or by using one of the many well illustrated bird books and pictures which may now be readily obtained. Have a small note book in your pocket in which to write down the points which you observe, and you will soon be surprised and pleased to see what an amount of interesting and valuable information you have gathered. Whenever possible visit museums where mounted birds properly named are exhibited.

HOW TO TEACH BIRD STUDY IN THE SCHOOLS

The following general suggestions prepared by Gretchen L. Libby published in Bulletin 2 of the California Fish and Game Commission cover the essential features for elementary work so well that they are quoted direct.

“Grouping of birds for study. In the lower grades birds may be studied by trades,—as carpenters, weavers, masons, fishermen, etc., while with the higher grades they may be grouped by families or according to the kinds of food eaten.

Study of individual birds. The best results are obtained when, at each lesson, thorough study is made of only one kind of bird, including male and female. The bird to be studied next should be announced at each lesson, as this gives the children an opportunity, in the meantime, to learn all they can about that particular bird. As far as possible the points to be brought out about each bird should be gained from the children, as this will encourage them to make individual observations.

Study of birds in general. Some time should be given to the discussion of birds in general. This makes it possible for the children to tell of any interesting observations made, or work done, to report new birds seen since the last lesson, and also to ask questions concerning birds which they could not identify, or other points about which they are doubtful. A little time may be taken for this general work at each lesson, but when a few minutes can be given at other times, possibly during the morning exercises, this helps to keep up the interest of the children.

Correlation of bird study with other subjects. While bird study seems to belong primarily in the nature study course, it may be correlated with other subjects.

The most natural and practical correlation can be made with the subject of agriculture, by having the children study the relation which the birds bear to their work along this line. As many of the boys in our public schools will be the agriculturists of the future, they should understand that the birds are the natural check to those pests which destroy our crops, and that the increase of these feathered workers will tend to add to the agricultural prosperity of our country.

Bird study may also be used with especially good results as a basis for occasional lessons in language and composition. This furnishes the children with a topic in which they are naturally interested, and one which touches their every-day lives, so that they are able to give personal experiences.

Some excellent problems can be prepared on the economic value of birds, and in this way bird study can be correlated with arithmetic. The following problems may serve as illustrations:

If a meadowlark carried 10 cutworms to its young in one hour, and continued this for ten hours a day, how many of these insects would be eaten by this brood during the day? Allowing 20 broods to the square mile, how many cutworms would be eaten daily by the meadowlarks in your county?

There are five marsh hawks on Mr. Smith's farm. How many mice will they destroy daily, if each hawk eats one mouse at a meal and has five meals each day? If each mouse caused Mr. Smith a loss of two cents, how much money would the hawks save him each day? How much would they save him during the year?

SPECIAL WORK IN BIRD STUDY

Field excursions. While books and pictures may be helpful in interesting children in this work, the use of these alone would be placing bird study on a very narrow basis. Here, as in all other branches of nature study, by far the best way is to take Mother Nature for our teacher and study the birds in their native haunts. There is no better way to lead the children to see the value of bird life than by actual observation. With this idea in view, much good may be accomplished by taking a few children at a time on field excursions. If it is not possible for the teacher to go, the children may be encouraged to take walks by themselves and report on what they have seen.

Note books. Children can make attractive bird booklets of their own by writing descriptions of the birds studied. Poems and stories may also be included in these. If more elaborate ones are desired, they may be illustrated with colored drawings of birds made by the children, or with bird pictures, and appropriate covers may be made.

Scrap book on birds. A valuable scrap book may be prepared by having the children bring in clippings on birds, including articles, poems, stories, and songs. This material will be found very useful when preparing for the Bird and Arbor Day program.

Birds games and debates. An occasional bird game will give variety to the work. The following very simple one will serve as an illustration. Some child describes a bird, giving as many points about it as possible, but not telling its name. The other children guess what bird it is, and the one who gets it right has the privilege of describing the next bird. This may be used as a review exercise after a number of birds have been studied. With younger children games in which they impersonate the birds may be used. In the higher grade a debate often adds interest to the bird study. Some such topic as the following may be chosen: Resolved, that birds save much more than they destroy.

Bird calendar. Children will be interested in keeping a bird calendar. This should include the birds studied, with a few points about each one, as follows:

Name of bird.

When seen (resident, found all the year in one locality; summer, found only in summer; or winter, found only in winter.)

Date when first seen.

Date of departure.

Where seen.

Time and place of nesting.

Food.

Each child may have an individual calendar, or a large one may be kept for the whole school.

Bird List. Each school may also make a list of all birds found in their locality during the year.

Food chart. It is hoped that a number of separate food charts will also be prepared from observations made by the children. These charts may be put in some such simple form as the following:

Name of bird.

Kind of food eaten.

Food found where.

Food given young birds.

Economic value of food eaten.

In this connection the older children may make a special study of those birds which are complained of in their locality. Various methods of protecting crops may also be tried. (See Methods of Attracting Birds.) Work of this kind can be made of real, practical value, for the harm done by birds to fruit and other crops can often be traced to a scarcity of water or their natural food supply, at that particular season. In many cases, birds which are destructive to certain crops are, on the other hand, among the valuable insect and weed destroyers.

Children will be interested in making collections of insects and weed seeds eaten by different birds.

SPECIAL POINTS TO EMPHASIZE IN BIRD STUDY.

Economic value of birds. In the higher grades special emphasis should be placed on the economic value of birds to the farmer and fruit grower. If bird study in our schools is to be of practical value, the foundation must be laid on something besides sentiment.

Individual work by children. Above all, get the children to doing individual work, and making original observations, for this is the basis of all really successful work in bird study. One discovery made by the boy himself is worth any number of facts taken from books, or told him by the teacher.

At first it will be necessary to caution the children not to jump at conclusions, but to be accurate in their obser-

ventions; for this is the only way in which their work can be of value. For instance, simply because a bird is seen in a fruit tree does not necessarily mean that it is eating fruit. It may be destroying injurious insects. Children should also be cautioned about visiting nests too often or staying too long.

The making of bird boxes, feeding tables, and drinking fountains for the birds should be encouraged. This gives the children an opportunity to study the habits of different birds, and also does much to establish a feeling of good fellowship toward the birds."

STUDY OF BIRDS BY GROUPS.

The systematic arrangement of species may be studied to advantage in getting acquainted with the chief groups of birds. Adults and older pupils in the school will find it of the utmost importance to learn to recognize the structure and appearance of birds by the groups known as orders and families through studying typical representatives.

The following list will give some of the common species which seem best suited for study and observation in North Dakota with this object in view. The list is arranged following classification and common names used in the 1910 edition of the Check List of the American Ornithologists' Union. The scientific names and the finer distinctions of varieties are usually purposely omitted as not suited to the purposes of this bulletin.

Order Pygopodes—Diving Birds.

Holboell's Grebe, Eared Grebe, Pied-billed Grebe, and Loon.

Order Longipennes—Long-winged Swimmers.

Herring Gull, Ring-billed Gull, Franklin's Gull and Black Tern.

Order Steganopodes—Totipalmate Swimmers.

Double-crested Cormorant and White Pelican.

Order Anseres—Ducks, Geese and Swans.

Hooded Merganser, Mallard, Gadwall, Green-winged Teal, Blue-winged Teal, Shoveller, Pintail, Redhead, Canvasback and Lesser Scaup ducks. Snow Goose, Blue Goose, White-fronted Goose, Canada Goose.

Order Herodiones—Hérons.

Bittern, Great-blue Heron, and Black-crowned Night Heron.

Order Paludicolae—Rails, Gallinules and Coots.

Whooping Crane, Sora Rail and Coot.

Order Limicolae—Shore Birds.

Wilson's Phalarope, Wilson's Snipe, Least Sandpiper, Yellow-legs, Solitary Sandpiper, Upland Plover, Spotted Sandpiper, Long-billed Curlew, Black-bellied Plover and Golden Plover.

Order Gallinae—Gallinaceous Birds.

Ruffed Grouse, Prairie Chicken, Sharp-tailed Grouse

Order Columbæ—Pigeons and Doves.

Mourning Dove.

Order Raptores—Hawks and Owls.

Marsh Hawk, Sharp-shinned Hawk, Cooper's Hawk, Western Red-tailed Hawk, Golden Eagle, Sparrow Hawk, Long-eared Owl, Short-eared Owl, Snowy Owl and Burrowing Owl.

Order Coccyges—Cuckoos, etc.

Black-billed Cuckoo and Belted Kingfisher.

Order Pici—Woodpeckers.

Northern Hairy Woodpecker, Downy Woodpecker, Yellow-bellied Sapsucker, Red-headed Woodpecker, Northern Flicker.

Order Macrochires—Swifts, etc.

Nighthawk, Chimney Swift and Ruby-throated Humming-bird

Order Passeres—Perching Birds.

Family Tyrannidae—Tyrant Flycatchers.

Kingbird, Arkansas Kingbird, Crested Flycatcher, Phoebe, Wood Pewee.

Family Alaudidae—Larks.

Horned Lark (different varieities).

Family Corvidæ—Crows, Jays and Magpies.

Magpie, Blue Jay, Crow.

Family Icteridae—Blackbirds, Orioles, etc.

Bobolink, Cowbird, Yellow-headed Blackbird, Thick-billed Redwing, Western Meadowlark, Orchard Oriole, Baltimore Oriole, Brewer's Blackbird, Bronzed Grackle.

Family Fringillidae—Finches and Sparrows.

Redpoll, Goldfinch, Snow Bunting, Lapland Longspur, Chestnut-collared Longspur, Vesper Sparrow, Harris's Sparrow, White-crowned Sparrow, White-throated Sparrow, Western Tree Sparrow, Chipping Sparrow, Slate-color-

- ed Junco, Song Sparrow, Rose-breasted Grosbeak, Indigo Bunting, Dickcissel.
- Family Hirundinidae—Swallows.
Purple Martin, Cliff Swallow, Barn Swallow, Tree Swallow, Bank Swallow, Rough-winged Swallow.
- Family Bombycillidae—Waxwings.
Bohemian Waxwing and Cedar Waxwing.
- Family Laniidae—Shrikes.
Northern Shrike and White-rumped Shrike.
- Family Vireonidae—Vireos.
Red-eyed Vireo Warbling Vireo.
- Family Mniotiltidae—Wood Warblers.
Black and White Warbler, Yellow Warbler, Myrtle Warbler, Chesnut-sided Warbler, Bay-breasted Warbler, Black-poll Warbler, Ovenbird, Grinnell's Water-thrush, Mourning Warbler, Yellowthroat and Redstart.
- Family Mimidae—Thrashers.
Catbird, and Brown Thrasher.
- Family Troglodytidae—Wrens.
Western House Wren, Short-billed Marsh Wren, Prairie Marsh Wren.
- Family Certhiidae—Creepers.
Brown Creeper.
- Family Sittidae—Nuthatches.
White-breasted Nuthatch.
- Family Sylviidae—Kinglets.
Golden-crowned Kinglet and Ruby-crowned Kinglet.
- Family Turdidae—Thrushes and Bluebird.
Olive-backed Thrush, Hermit Thrush, Robin and Bluebird.

List of birds especially suitable for observation, arranged according to seasons. In following the spring migration record should be kept of the date of arrival of a species, the date at which they become common, relative abundance, and in case of transients the date when last seen.

Spring and Summer—Residents and Transients:

Slate-colored Junco	Marsh Hawk
Swamp Sparrow	Sparrow Hawk
White-crowned Sparrow	Western Red-tailed Hawk
White-throated Sparrow	Cooper's Hawk
Harris's Sparrow	Sharp-shinned Hawk

Rose-breasted Grosbeak	Short-eared Owl
Song Sparrow	Screech Owl
Chipping Sparrow	Catbird
Vesper Sparrow	Brown Thrasher
Goldfinch	Solitary Sandpiper
Western Tree Sparrow	Upland Plover
Lark Bunting	Yellow-legs
Geese, various kinds	Killdeer
Ducks, various kinds	Wilson's Phalarope
Western Meadowlark	Wilson's Snipe
Red-winged Blackbird	American Bittern
Yellow-headed Blackbird	Great Blue Heron
Bobolink	Black-crowned Night Heron
Cowbird	Robin
Brewer's Blackbird	Bluebird
Bronzed Grackle	Hermit Thrush
Baltimore Oriole	Gray-cheeked Thrush
Belted Kingfisher	Kingbird
Black-billed Cuckoo	Arkansas Kingbird
Crow	White-rumped Shrike
Blue Jay	Loon
Prairie Horned Lark	Pied-billed Grebe
Mourning Dove	Holboell's Grebe
Bohemian Waxwing	Western House Wren
Cedar Waxwing	Short-billed Marsh Wren
Black Tern	Prairie Marsh Wren
Franklin's Gull	Barn Swallow
Ring-billed Gull	White-bellied Swallow
Nighthawk	Prairie Chicken
Chimney Swift	Sharp-tailed Grouse
Purple Martin	
Myrtle Warbler	
Oven-bird	
Grinnell's Water-thrush	
Redstart	
Yellow Warbler	
Black and White Warbler	

Fall:

Note preliminary preparations of summer residents for the southward migration, the date when last observed, the date of arrival and relative abundance of northern nesting birds, changes in plumage, etc.

Robin	Northern Hairy Woodpecker
Vesper Sparrow	White-breasted Nuthatch
Harris's Sparrow	Brown Creeper
Slate-colored Junco	Western Red-tailed Hawk
Western Tree Sparrow	Sparrow Hawk
White-crowned Sparrow	Sharp-shinned Hawk
Goldfinch	Cooper's Hawk
Chestnut-collared Longspur	Northern Shrike
English House Sparrow	Brewer's Blackbird
Northern Flicker	Western Meadowlark
Downy Woodpecker	Crow

Blue Jay
 Chickadee
 Kingbird
 Arkansas Kingbird
 Bohemian Waxwing
 Geese
 Ducks
 Cranes
 Bittern
 Grebes

Myrtle Warbler
 Short-eared Owl
 Marsh Hawk
 Red-winged Blackbird
 Kildeer
 Solitary Sandpiper
 Golden Plover
 Black-bellied Plover
 Prairie Chicken
 Sharp-tailed Grouse

Winter:

Prairie Chicken
 Sharp-tailed Grouse
 Ruffed Grouse
 Blue Jay
 Chickadee
 White-breasted Nuthatch
 Long-eared Owl
 Great-horned Owl

Short-eared Owl
 Snowy Owl
 Screech Owl
 Goshawk
 English House Sparrow
 Red-poll Sparrow
 Snowflake
 Brown Creeper

Other winter residents or visitants may be seen and constant outlook should be kept. Note seasonal variations or conditions which seem to account for unusual species remaining during the winter or species staying unusually late into winter.

TOPICS SUGGESTED FOR INVESTIGATION AND CLUB PAPERS.

- Birds of farm and garden.
- Birds of the city or village streets and parks.
- Bird study in our public school.
- Economic value of birds.
- Usefulness of birds to agriculture.
- Birds as tree protectors.
- Birds which winter in our vicinity.
- Our spring migrant birds.
- Birds which spend the summer in our locality and their habits.
- Birds which nest in our neighborhood and their habits.
- Means of saving and increasing our bird population.
- How to attract the birds.
- Agents of bird destruction in our locality.
- The fall migration and common migrants.
- How may boys be kept from killing birds and robbing nests.
- Our game and bird reservations.
- Life and habits of some one selected bird or species, eg. Meadowlark, Bobolink, etc.
- Birds of our lawn.

Winter feeding of birds.
 Making bird houses.
 Economic relations of hawks and owls.
 Our native sparrows.
 Economic status of different kinds of blackbirds.
 Study of bird songs and notes.
 How to learn to recognize our birds afield.
 Birds in literature.
 The use of birds in paintings.
 Relation of the milliner's trade to bird life.
 Adaptive coloration in birds.
 Dangers to nesting birds in our vicinity.
 Materials used by birds in the construction of nests.
 Care of young birds by parents.

LITERATURE AND OTHER MATERIALS HELPFUL IN BIRD STUDY IN NORTH DAKOTA.

Manuals and Guides for identifying birds:

Handbook of Birds of the Western United States. By Florence M. Bailey. Houghton, Mifflin & Co., Boston, Mass.	\$3.50
Handbook of Birds of Eastern North America. By Frank M. Chapman. D. Appleton & Co., New York	3.50
Color Key to North American Birds. By Chapman & Reed. Doubleday Page & Co., New York	2.50
Birds of Eastern North America. By Chester A. Reed. Doubleday Page & Co., New York	3.00
Land Birds. Chester A. Reed .....	.75
Water Birds. Chester A. Reed	1.00
Chas. K. Reed, Worcester, Mass.	
How to Know the Wild Birds. By D. Lange Northwestern School Supply Co., Minneapolis, Minn.	.25
Birds of the West. By Charles E. Holmes Hammond & Stephens Co., Fremont, Nebraska. ..	1.00

Books upon Special Topics for Teachers and Adults:

Our Native Birds: How to Protect them and Attract them to Our Homes. By D. Lange. The Macmillan Co., New York	1.00
Birds in Their Relation to Man. By Weed and Dearborn. Lippincott & Co., Philadelphia, Pa.	2.50
Useful Birds and Their Protection. By Edw. H. Forbush. Mass. State Board of Agriculture, Boston, Mass.	2.00
Bird Day: How to Prepare for it. By C. A. Babcock Silver Burdett & Co., New York .....	.50
Methods of Attracting Birds. By Gilbert H. Trafton Houghton, Mifflin & Co., Boston Mass.	1.25
Nature Study and Life. By C. F. Hodge Ginn & Co., Boston, Mass.	1.50

The Bird: Its Form and Function. By C. W. Beebe Henry Holt & Co., New York	3.50
The Story of the Birds. By James N. Baskett D. Appleton & Co., New York .....	.65
The Woodpeckers. By Fannie H. Eckstrom Houghton, Mifflin & Co., Boston, Mass.	1.00
American Birds, Photographed and Studied from Life. By Wm. L. Finley. Charles Scribners Sons, New York.	1.50
Michigan Bird Life. (Exceptionally valuable for the price) By W. B. Barrows. Published by Michagan Agricultural College, East Lansing, Michigan. Price plus postage; Paper \$.80, Cloth .....	.95

Books for Children—Good for supplementary reading in schools:

The First Book of Birds	\$.60
The Second Book of Birds	1.00
True Bird Stories .....	.60
Little Brothers of the Air	1.25
In Nesting Time	1.25
By Mrs. Olive Thorne Miller, Houghton, Mifflin & Co., Boston, Mass.	
Birds of Village and Field	2.00
Birds Through on Opera Glass .....	.75
By Mrs. Florence Merriam Bailey. Houghton, Mifflin & Co., Boston, Mass.	
Wake-Robin	1.25
Birds and Poets	1.25
By John Burroughs. Houghton, Mifflin & Co. Boston, Mass.	
Our Birds and Their Nestlings. By Margaret C. Walker. American Book Co., New York .....	.60
Our Feathered Friends. By Elizabeth and Joseph Grinnell. D. C. Heath & Co., Boston Mass. ....	.30
Our Friends the Birds. By Caroline H. Parker A. Flanagan Co., Chicago .....	.50
Gray Lady and the Birds. By Mabel Osgood Wright Macmillan & Co., New York	1.75
Birds of Song and Story. By Elizabeth and Joseph Grinnell. A. W. Mumford, Chicago	1.00
The Birds Convention. By Harriett Williams Myers Western Publishing Co., Los Angeles, Cal. ....	.75

Books for General Reading:

A-Birding on a Broncho. By Florence Merriam Houghton, Mifflin & Co., Boston, Mass.	\$1.25
How to Study Birds	1.50
The Sport of Bird Study	2.00
By Herbert K. Job. The Outing Publishing Co., New York.	
Among the Water Fowl. By Herbert K. Job. Doubleday Page Co., New York	1.50
Wild Neighbors. By Ernest Ingersoll. The Macmillan Co., New York	1.50

Wild Life of Orchard and Field. By Ernest Ingersoll Harper Bros., New York.	1.40
Citizen Bird. By Mabel Osgood Wright and Elliott Coues. Macmillan Co., New York	\$1.50
Bird Life. By Frank M. Chapman D. Appleton & Co., New York	2.00
Bird Studies with a Camera. By Frank M. Chapman D. Appleton Co., New York	1.75
The American Natural History. By W. T. Hornaday Charles Scribners Sons, New York	3.50

Magazines devoted to Bird Study:

Bird Lore (Official publication of the National Association of Audubon Societies. Very useful for schools. Offered as a premium by the North Dakota Audubon Society with membership.) D. Appleton & Co., New York.	\$1.00
The Condor (Published by Cooper Ornithological Club) Address J. Eugene Law, Hollywood, Cal.	1.50
The Auk (A quarterly journal the official publication of the American Ornithologists Union). Address Jonathan Dwight, Jr., 134 West 71st. St. New York	3.00

Publications of the Bureau of Biological Survey, United States Department of Agriculture, especially useful in the study of North Dakota birds.

NOTE: Application for publications in this list should be made to the Editor and Chief of the Division of Publications, United States Department of Agriculture, Washington, D. C. The editions of some of the publications are necessarily limited, and when the supply is exhausted and no funds are available for procuring additional copies, applicants are referred to the Superintendent of Documents, Government Printing Office, who has them for sale at a nominal price, under the law of January 12, 1895. Many of these publications may be obtained as "Package Libraries" from the Agricultural College.

In applying give name and number of the bulletin and the name of the bureau of Biological Survey.

BULLETINS:

Bulletin 13. Food of the Bobolink, Blackbirds and Grackles	
" 15. The Relation of Sparrows to Agriculture	
" 17. Birds of a Maryland Farm—A local study	
" 18. Distribution and Migration of North American Warblers	
" 21. The Bobwhite and Other quails of the United States in their Economic Relations	
" 23. The Horned Larks and Their Relation to Agriculture	
" 24. The Grouse and Wild Turkeys of the United States and Their Economic Value	
" 26. Distribution and Migration of North American Ducks, Geese and Swans	
" 27. The North American Eagles and Their Economic Relations.	
" 32. Food Habits of the Grosbeaks	

- " 35. Distribution and Migration of North American Shore Birds
- " 37. Food of the Woodpeckers of the United States
- " 39. Woodpeckers in Relation to Trees and Wood Products
- " 44. Food of our more Important Flycatchers

Farmers' Bulletins, U. S. Bureau of Biological Survey:

- F. B. 54. Some Common Birds
- " 383. How to Destroy English Sparrows
- " 456. Our Grosbeaks and their Relation to Agriculture
- " 493. The English Sparrow as a Pest
- " 497. Some Common Game, Aquatic and Rapacious Birds in Relation to Man
- " 506. Food of some Well Known Birds of Forest, Farm and Garden.

Circulars, U. S. Bureau of Biological Survey:

- " 17. Bird Day in the Schools
- " 56. Value of Swallows as Insect Destroyers
- " 61. Hawks and Owls from the Standpoint of the Farmer
- " 72. Private Game Preserves and Their Future in the United States.
- " 79. Our Vanishing Shorebirds
- " 81. Three Important Wild Duck Foods

Separate Reprints from the Yearbook. Apply for Yearbook Separate, giving number.

- Y. B. Sep. 37. Part 2. The Meadowlark and Baltimore Oriole
- " " 133. Birds as Weed Destroyers
- " " 364. Some Benefits the Farmer May Derive from Game Protection
- " " 443. Does it Pay Farmers to Protect Birds?
- " " 474. The Economic Value of Predaceous Birds and Mammals
- " " 486. The Relations between Birds and Insects
- " " 504. Plants Useful to Attract Birds and Protect Fruit
- " " 545. The Migratory Movements of Birds in Relation to the Weather
- " " 564. Bird Enemies of the Codling Mith.

EDUCATIONAL LEAFLETS:

Published by the National Association of Audubon Societies, 1974 Broadway, New York, especially useful for schools.

- | | |
|---------------------------|--------------------------|
| 1. Nighthawk | 11. Screech Owl |
| 3. Meadowlark | 12. Short-eared Owl |
| 4. Robin | 13. Ostrich |
| 5. Flicker | 14. Barn Owl |
| 7. Snowy Heron | 15. Tree Sparrow |
| 8. Marsh Hawk | 16. Yellow-billed Cuckoo |
| 9. Red-shouldered Hawk | 29. Herring Gull |
| 10. American Sparrow Hawk | |

SPECIAL LEAFLETS:

- | | |
|-------------------------------------|------------------------------------|
| 2. Purple Martin | for Winter |
| 3. Bird Clubs in Schools | 13. For December—Six Reminders. |
| 5. The Aigrette Loses Cast | 15. February Hints |
| 7. February | 17. Bobwhite, the Farmers' Friend |
| 8. April—Nature Study Organizations | 18. How Our Birds Spend the Winter |
| 9. In June | 21. The Horrors of the Plume Trade |
| 11. August and the Flocking Time | |
| 12. October and Preparations | |

The above leaflets published with uncolored illustrations. One cent each. Ten cents per dozen.

EDUCATIONAL LEAFLETS:

- | | |
|-----------------------------------------------------|---------------------------------------|
| 2. Mourning Dove | 37. Sharp-shinned Hawk |
| 6. Passenger Pigeon | 38. Bobolink |
| 17. American Goldfinch | 39. House Wren |
| 18. Cardinal | 40. Bush-Tit |
| 19. Belted Kingfisher | 41. Mockingbird |
| 20. Rose-breasted Grosbeak | 42. Orchard Oriole |
| 21. Scarlet Tanager | 43. Red-headed Woodpecker |
| 22. Blue Jay | 44. Franklin's Gull |
| 23. Kildee. | 45. Black-headed Grosbeak |
| 24. Bluebird | 46. Robin |
| 25. Red-winged Blackbird | 47. Bobwhite |
| 26. Baltimore Oriole | 48. Cedar Waxwing |
| 27. Indigo Bunting | 49. Chimney Swift |
| 28. Purple Finch | 50. Carolina Wren |
| 30. Snowflake | 51. Spotted Sandpiper |
| 31. Song Sparrow | 52. Least and Semi-palmated Sandpiper |
| 32. Barn Swallow | 53. Horned Lark |
| 33. Tree Swallow | 55. Downy and Hairy Woodpecker |
| 34. Ruby-crowned Kinglet and Golden-crowned Kinglet | 56. Hummingbird |
| 35. American Crossbill and White-winged Crossbill | 57. Yellow-headed Blackbird |
| 36. The Mallard | |

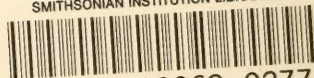
SPECIAL LEAFLETS:

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| 6. Bartramian Sandpiper | 10. Wood Duck |
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